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Logistics and Engineering Requirements for Humanitarian Assistance Operations

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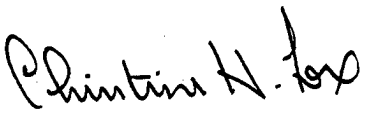

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In this paper, we present the results of a study conducted by the Center for Naval Analyses (CNA) that identifies and analyzes alternative ways the Marine Corps might consider to improve its ability to conduct Humanitarian Assistance Operations (HAOs). To achieve this objective, we are (1) examining requirements needed to conduct HAO's; (2) identifying potential changes in the Marines' conduct of HAOs to meet the requirements; and (3) assessing the cost of the changes in terms of organization, training and education, doctrine, equipment, and supplies. This study is co-sponsored by the Marine Corps Combat Development Command (MCCDC) and I Marine Expeditionary Force (IMEF). Here we address logistics and engineering-related requirements and alternatives. The paper is one in a series that documents military requirements and alternatives for HAOs.

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Contents

Summary

In this paper, we present the results of a study conducted by the Center for Naval Analyses (CNA) that identifies and analyzes alternative ways the Marines Corps might consider to improve its ability to conduct humanitarian assistance operations (HAOs). To achieve this objective, we are (1) examining requirements needed to conduct HAOs; (2) identifying potential changes in the Marines' conduct of HAOs to meet the requirements; and (3) assessing the cost of the changes in terms of organization, training and education, doctrine, equipment, and supplies. This study is co-sponsored by the Marine Corps Combat Development Command (MCCDC) and I Marine Expeditionary Force (I MEF).

Here we address *logistics and engineering-related* requirements and alternatives. The paper is one in a series that documents military requirements and alternatives for HAOs. Other papers in this series cover requirements for planning, training, civil affairs and psychological operations, legal matters, command relationships, coordination with relief organizations, measures of effectiveness (MOEs), and domestic operations [1 – 8]. A summary of results from this series can be found in [9].

Methodology

First, we identified logistics and engineering requirements by examining past operations, exercises, seminars, and conferences. Then we compared these requirements to organic Marine logistics and engineering capabilities to identify those requirements unique to HAOs; those similar to warfighting requirements, but with a different emphasis; and those that are the same as warfighting requirements. For the first two categories, we identified alternative ways that these requirements could be met. Finally, we determined whether these

alternatives could be met through changes in organization, training, equipment, or doctrine.

Summary of results

Conducting extensive *coordination* is especially critical in the area of logistics and engineering support in order to deconflict civilian and military support operations and to avoid duplication of effort. The military should make doctrine and organization changes to ensure that effective coordination takes place with U.S. military logisticians and other HAO players, such as the United Nations (UN), relief organizations, and the host nation. This can happen by including relief community representation in Commander in Chief (CINC) and Combined/Joint Task Force (C/JTF) planning.

The traditional tasks of *sharing, collecting, and managing information* to support initial logistics assessments and to perform estimates of supportability for planning purposes also apply to HAOs. However, the assessments must support planning for both civil and military requirements. The military should develop an information management system to consolidate and prioritize U.S. military, coalition, relief organizations, and the host-nation logistics and engineering requirements during the planning process. The Marine Corps could meet these requirements through changes in doctrine and education.

During execution of an HAO, the Marine Corps needs to *develop a C/JTF organizational structure* that facilitates a free flow of logistics and engineering-related information to ensure that the Marines address the requirements and concerns of the HAO players. The organizational structure should also address all levels of logistics support. When analysis of the mission and situation indicate that significant theater-level logistic support is required, the military should consider forming a functional logistics component within the C/JTF, such as a joint logistics support command (JLSC). If formed, the JLSC should include "stove pipe" agency representation (i.e., Defense Logistics Agency). Appropriate supporting staffs will identify and source key positions in the JLSC. If no JLSC is formed, the C/J4 should assume staff supervision of assigned theater logistic resources. The C/JTF commander should also consider forming a Civil-Military Logistics

Center (CMLC), either within the JLSC or the Civil-Military Operations Center (CMOC) to provide a direct interface between relief organizations and the military on logistics- and engineering-related matters.

HAO participants need a better definition of *procedures for the movement of resources* at all levels. HAO players, including the military, must coordinate their shipments. The military must prepare for the fact that relief and other non-DOD organizations are likely to influence the development of Time-Phased Force Deployment Database (TPFDD) elements and priorities. These other organizations will not be in the TPFDD, but will affect the flow of resources into the host nation because they also have important resources to bring in.

Some changes in *equipment acquisition* might also be required. Marines (as well as other services) tend to focus their acquisition strategies on the larger weapon systems that are geared toward warfighting. But it is also important to incorporate non-warfighting equipment requirements into the overall acquisition strategy. This is particularly crucial for HAOs, where the logistics engineering and support equipment is likely to be the asset in high demand. The Marine Corps needs to ensure that their acquisition strategy reflects and incorporates HAO equipment requirements, such as reverse-osmosis water-purification units, material-handling equipment, and other critical engineering equipment.

Long-term rehabilitation and redevelopment efforts by the follow-on organization can by stymied if the Marines or the military do not take appropriate measures to ensure that long-term reliance on the military logistics and engineering effort is minimized. The Marines should consider the following doctrinal issues:

- Ensure that the relief community/host nation can sustain any infrastructure improvements after the military leaves by minimizing reliance on military equipment, providing appropriate training, and ensuring the technology required to sustain the effort is at an appropriate level for the local population.
- Use and accommodate the existing logistics-support system to minimize disruption of relief activities and to ensure sustainability.

- Modify contingency contracting procedures to ensure that the introduction of military forces does not drive up prices for local services and goods.
- Develop logistics- and engineering-related measures of effectiveness to track progress toward the end state.

Introduction

This report presents the results of a study undertaken by the Center for Naval Analyses (CNA) at the request of MCCDC and I MEF. The primary objective of the study is to identify and analyze some alternative ways the Marine Corps might consider to improve its ability to conduct HAOs. To meet this objective, we are

- Examining the requirements for conducting HAOs
- Identifying changes the Marines or military can make to meet these HAO requirements
- Assessing the relative costs of these changes in terms of organization, training and education, doctrine, and equipment and supplies.

This report focuses on logistics and engineering requirements for HAOs. It is one in a series of reports that addresses HAO requirements and alternatives. Other reports in this series address legal, training, civil affairs and psychological operations, planning, command relationships, improving coordination with relief organizations, measures of effectiveness, and domestic operations requirements for humanitarian assistance operations [1 – 8]. A summary of these reports can be found in [9].

Overview

In this paper, we examine both general and specific logistics- and engineering-related requirements for HAOs. The latter are requirements for a specific functional area. Such areas include: bulk water production; bulk fuel operations; power production; hygiene and sanitation; facilities construction and repair; supply support; transportation; food; and mine and unexploded ordnance clearing. General logistics- and engineering-related requirements are those that apply to all the specific functional areas. Most of the general

requirements have to do with planning and coordination for logistics and engineering support.

Identifying requirements

The method used to identify logistics and engineering requirements focused on examining the types of tasks performed by Marines and other services during several recent HAOs. First, we examined the historical record to identify which types of HAOs have occurred most frequently in the past. We then studied lessons learned from past HAOs, as well as those from selected case studies, HAO seminar games, and HAO exercises.

Our analysis included lessons learned from Restore Hope, Provide Comfort, Sea Angel, GTMO (Guantanamo Bay), Fiery Vigil, Eastern Exit, the Los Angeles Riots, the San Francisco Earthquake, and the Hurricane Andrew relief effort. In addition, we incorporated lessons learned from other sources, such as the Chief of Naval Operations' (CNO's) HAO seminar held last year [10] and both last year's and this year's Exercise Emerald Express [11,12].

We developed a requirements matrix for each functional area under consideration and compared these requirements to organic Marine Corps logistics and engineering capabilities to identify those that overlap with traditional warfighting requirements and those that are different for HAOs. We then identified how these latter requirements could be met. Finally, we took these unique requirements and determined if they could be met through doctrine, equipment, organization, or education and training.

General logistics and engineering requirements for HAOs

In this section, we discuss what we term "general" logistics and engineering requirements for HAOs. These requirements are common to most of the specific logistics and engineering functional areas. In short, these general requirements form the framework for developing specific functional-area requirements.

Table 2 in appendix A provides a detailed listing of these general requirements. We have grouped them into four broad categories:

- Liaison and coordination
- Assessments
- Plans and concepts of operation
- Other general planning concerns.

The following sections examine requirements from each of these categories in greater detail. Many of the requirements discussed here were developed on the basis of lessons learned from past HAOs, and others were identified during the recent Emerald Express '95 exercise that we developed further [12].

Liaison and coordination

Conducting extensive liaison and coordination is a key requirement during HAOs. It is especially critical in the area of logistics and engineering support in order to

- Ensure mutual education among participants who have little knowledge or understanding of each others' unique logistics and engineering capabilities and requirements
- Deconflict humanitarian and military-support operations

- Avoid duplication of effort
- Ensure that all participants understand U.S. goals and objectives
- Solicit input from other participants on problems to be faced and areas where the greatest assistance will be required.

During the pre-crisis phase, it is critical that military forces coordinate closely with both the non-governmental organizations/private volunteer organizations (NGOs/PVOs), as well as with senior United Nations (UN) representatives and coalition forces to help determine logistics and engineering requirements. Creating a position for and requesting a humanitarian advisor (HUMAD) on the CINC staff could also provide insights on logistic and engineering requirements for HAOs by providing the capabilities of the humanitarian community in the prospective intervention area. The HUMAD could be provided by the U.S. Agency for International Development (USAID) or an organization such as INTERACTION (an umbrella organization for U.S. PVOs) to facilitate coordination with NGOs/PVOs. Another method would be to request NGO/PVO representation for each potential Combined/Joint Task Force (C/JTF) command during the planning, execution, and reconstruction of C/JTF HAO exercises and operations. Coordination or participation with Disaster Assessment Response Teams (DARTs) and other in-country assessment teams would also go a long way toward improving planning and execution coordination among the HAO participants.

Assessments

The traditional tasks of conducting initial assessments and performing estimates of supportability also apply to HAOs. Logistics and infrastructure concerns need particular attention during assessments to support mission planning. Such assessments will also ensure that the initial arrival of forces supports both civil and military actions through the appropriate division of access to ports, airfields, warehouses, and other facilities; support equipment; major supply routes; and so forth. This section presents some of the key requirements for

ensuring that these assessments are adequate for developing initial plans and concepts of operation. They include the following:

- Gathering, sharing, and managing information
- Identifying military-unique capabilities for HAOs
- Prioritizing requirements
- Meeting requirements.

The following sections look at each of these requirements in more detail.

Gather, share, and manage information

Because U.S. forces must often deploy with little or no notice to areas in which little logistical support information is available, it is important to begin the information collection, management, and sharing process early in the pre-crisis and planning phases of a mission. Otherwise, the C/JTF runs the risk of deploying with excess or missing logistics capability because of lack of information. Both of these situations can have an adverse impact on C/JTF effectiveness, especially during the critical first days of a deployment.

One of the ways to avoid this situation is to make early use of all available information-collection and sharing mechanisms already in place. One such mechanism is the Logistics Civilian Augmentation Program (LOGCAP). The LOGCAP contract, managed by the Army, requires the designated contractor to maintain general logistics information on a regional basis and specific information on nations. The CINCs and designated C/JTF commanders should make plans early to arrange access to this database. The CINC could also request that the Army task the LOGCAP contractor to provide more detailed information once an emergency intervention appears imminent.

Numerous organizations, including relief organizations, USAID, and the UN, conduct assessments that can help develop logistics and engineering requirements for a particular operation. The proliferation of logistics assessments and a lack of coordination or consolidation of such assessments has been identified as a problem in previous HAOs. This situation often results in varied assessments, gaps in information,

misunderstandings among potential participants, and duplication of effort. A standard procedure needs to be developed during mission planning to ensure that assessments are coordinated among all participants. The logistics personnel should work with the intelligence community to ensure that they gather the appropriate logistics and engineering information and fuse that information into a coordinated and accurate assessment of the logistics and engineering situation. This information includes understanding logistics and engineering capabilities already present, and working with the host nation so the military will not duplicate those efforts. See [4] for a discussion on information coordination for HAOs.

Identify military-unique capabilities

During the initial assessments, the military must also focus on identifying those critical logistics capabilities that are military-unique and that might be applied in a HAO. Some examples of these unique capabilities include sea and aerial port operations and openings, over-the-shore fuel discharging, logistics for high-threat regions, bulk water production and distribution, a complete strategic airlift package, self-supporting logistics capability, and oversized or outsized lift delivery.

Prioritize requirements

When deploying for an HAO, the military should remember it is not the only user of airfields and ports. Other players will compete for berthing spaces, port and airfield storage facilities, and material-handling equipment (MHE) to offload equipment and supplies. The military needs to incorporate relief-organization and coalition-force requirements with its own requirements. A system must be developed whereby U.S. military, coalition military, and non-military requirements can be consolidated, prioritized, and coordinated.

Meet requirements

U.S. logistics and support forces will be in great demand during most HAOs. The traditional "tooth to tail" ratios may not apply. Instead, it is possible that the support force (i.e., logisticians and engineers) will make up the dominant part of the military force in many HAOs

(especially disaster-relief missions). Because the resident logistics capability for HAO-type tasks is often found in the Reserve Forces (especially for the Army), the key issue becomes one of identifying how the military will provide the required level of logistics support without calling up Reservists. Identifying and examining potential alternative sources for meeting logistics requirements is a critical task in the pre-crisis phase. Alternatives that should be considered include capabilities resident in the active forces, contractor support, NGO/PVO/IOs, and the host nation.

For example, the U.S. military might have insufficient active combat service support forces to sustain operations other than war (OOTW) if a troop-rotation requirement is established. This problem is compounded by the fact that there is often political reluctance to institute a presidential Selective Reserve call-up authority. As an alternative, the use of LOGCAP as a Combat Service Support (CSS) replacement force should be considered during logistics planning, especially if the operation is expected to last beyond 90 days. If a decision is made to activate LOGCAP, logistics planners should include the LOGCAP contractor in the early phases of mission planning to include augmentation in any advance teams.

Plans and concepts of operation

Developing plans and initial concepts of operation are requirements that also span the range of logistics and engineering functional areas. Many of the requirements are similar to those for traditional military missions. Some examples include developing standardized procedures for reporting, clearly assigning logistics and engineering support responsibilities, and updating planning guidance as the situation develops. However, some requirements, though similar to those for traditional missions, are quite different in their execution during HAOs. We will discuss five of these requirements in greater detail:

- Developing a concept for force deployment
- Identifying the organizational structure for logistics support
- Planning for the transition of logistics and engineering functions to follow-on organizations

- Planning for redeployment and force reconstitution
- Addressing financial-management issues.

Force deployment

Developing a concept for force deployment is another key consideration during HAO mission planning. Issues include access to existing infrastructure, and the incorporation of coalition force- and relief-organization requirements into the deployment plan.

As stated previously, when deploying for an HAO, the military needs to remember that it is not the only user of airfields and ports. This requires incorporation of relief-organization and coalition-force requirements with organic requirements.

During HAO deployments, the military should also focus on getting C4I in early (to help identify required capabilities); improving data visibility (to help set priorities); establishing a pull versus push system (to avoid overwhelming the ports and airfields); and focusing more attention on identifying capabilities of various organizations. This requires coordinating extensively with the key players in an HAO during planning and execution.

Another issue concerns the incorporation of coalition-force and relief-organization support requirements into the U.S. military deployment plan. Relief organizations, UN organizations, and other coalition forces can be critical implementors of emergency assistance, but they often do not have access to adequate support, especially airlift. The military needs to ensure that procedures for UN-coordinated airlift, as well as airlift run without the UN, support the critical movement needs of coalition forces and others (i.e., relief organizations) as they relate to overall priorities. Unfortunately, these procedures seldom exist. And when they do, they may vary based on funding for shipment of resources.

HAO participants need a better definition of procedures for the movement of resources at all levels. All shipments should be coordinated and prioritized by the key players in an HAO. Also, the military needs to better communicate procedures to all potential users in

order to prevent unrealistic expectations. The bottom line is that the military must prepare for the fact that NGO and other non-DOD organizations are likely to influence the development of TPFDD elements and priorities. The military must coordinate with relief and other non-DOD organizations to develop a movement plan that includes the movement of military and relief-organization resources for the HAO. This is quite different from traditional military missions, where the TPFDD is most often developed solely on the basis of DOD-specified requirements and assessments.

Organizational structure

HAOs require a robust two-way flow of information between civilian agencies, relief organizations, coalition partners, and the military. The C/JTF organizational structure must facilitate a free flow of logistics-related information to ensure that the requirements and concerns of all participants are addressed. In addition, the organizational structure needs to consider all levels of logistics support (i.e., theater, tactical, etc.). When analysis of the mission and situation indicate that significant theater-level military logistic support to the HAO is required, forming a joint logistics support command (JLSC) should be considered. If formed, the JLSC would include "stove pipe" agency representation (e.g., Defense Logistics Agency) and key positions with the JLSC would be identified and sourced from appropriate supporting staffs. If no JLSC is formed, the C/J4 would assume staff supervision of assigned theater logistic resources.

The C/JTF commander should also consider forming a Civil-Military Logistic Center (CMLC) capacity within either the JLSC or the CMOC to provide a direct interface between relief organizations and the military on logistics-related matters. If there are considerable civilian logistics requirements, perhaps the CMLC should be part of the CMOC rather than the JLSC, so that the CMLC can be more easily transitioned to the follow-on organization. In addition, frequently logistics requirements would need to be coordinated with other requests for military support (such as security). In this case, separating the CMLC from the CMOC would not be feasible.

Transition planning

Successful transition of logistics-support functions from the C/JTF to relief organizations or the host nation is essential to the continued success of the HAO. Unfortunately, there is no guidance on how this transition should take place. The military should consider a number of general factors when planning for and executing the transition of logistics-support functions. First, this transition should be made part of the C/JTF mission tasking, and the C/J4, in coordination with the future plans section of the JTF staff, should be tasked with developing a logistics transition handoff plan before or during CAP. This plan should be fully coordinated with all key players in the HAO. In addition, the C/JTF commander's exit strategy should detail guidelines for the logistics handoff to a transitional authority. Other considerations include cost (who pays), equipment transfers (government-furnished equipment versus contractor-furnished equipment), contractor responsibilities, restrictions on coalition or international logistics support, and contractor security.

Sustainability of accomplishments is another important element of transition planning. Long-term rehabilitation and redevelopment efforts can be stymied if appropriate measures are not taken to ensure that long-term reliance on the military logistics effort is minimized. A number of considerations apply here. First, the military should consider modifying its contingency contracting procedures to ensure that the long-term price of logistics-support assets in country are not affected. Ensuring that the introduction of military forces does not force up prices for local services and goods should be a key consideration [4, 9].

Second, the military must ensure that any infrastructure projects are sustainable by the local population and remaining relief organizations after military forces have departed. This means that, in the long term, reliance on military equipment should be minimized, appropriate training should be provided, and the technology required to sustain the effort is at an appropriate level for the local population. For example, instead of leaving reverse-osmosis water-purification units (ROWPUs) to provide pure water to the population, the military should focus on drilling wells or repairing the local water system. The

local population also should be trained so they can maintain any new equipment or systems left behind by the military.

Third, every effort should be made by the military to use and accommodate the existing logistics-support system. This will ensure minimal disruption of relief activities, and ensure that any logistics efforts are sustainable after the military forces depart. And the military must take care to avoid raising the expectations of the local population in terms of long-term services and infrastructure improvements.

Developing clearly defined measures of effectiveness (MOEs) to track progress toward an end state is another key consideration in transition planning. Logistics- and engineering-related MOEs are likely to be some of the most important measures in tracking progress toward a military end state. Development of these MOEs should receive careful attention during the mission-planning phase. Logistics and infrastructure-related MOEs should address airfield and port capability, trafficability of key transportation routes, status of the infrastructure repair and rebuilding effort, and development of long-term, self-sustaining logistics capability (e.g., potable water sources, electrical power-generation capability, water-purification capability, sanitation services established). Reference [7] provides a construct for developing mission-appropriate MOEs.

Redeployment and force reconstitution

Redeployment of the force is another key planning consideration that must be addressed for HAOs. Logistics-related redeployment considerations are similar to deployment considerations. That is, the military should ensure that the right people and equipment depart at the correct time based on incremental transition to follow-on organizations or the host nation. Redeployment must accommodate different timetables. The phaseout of equipment must be planned well ahead of time, with extensive coordination among all coalition partners and follow-on organizations. Coordination must take place to ensure availability of storage for equipment at the airports of embarkation/seaports of embarkation (APOEs and SPOEs), and availability of washdown facilities and material-handling equipment (MHE) for loading ships and aircraft.

One of the most important and time-consuming elements of force reconstitution is equipment maintenance and preparation. This can take place either in theater before the departure of forces or out of theater. Maintenance of equipment can include anything from washdowns (performed in theater) to complete overhaul of equipment (usually performed out of theater). The military must make decisions on when and where equipment maintenance will be performed well before force reconstitution. The fact that the support force might be the dominant portion of any force participating in an HAO means that equipment maintenance requirements might be different from those following a traditional military operation.

Reconstitution of maritime prepositioned forces (MPF) will require significant attention during redeployment. MPF maintenance-cycle schedules and other factors will determine how and what equipment is backloaded on the ships. The military must develop a backload plan as early as possible (before the transition phase) to ensure equipment accountability and SPOE availability.

Maintenance of the equipment to be left once military forces depart is another key redeployment consideration. Equipment left behind to support rehabilitation and redevelopment efforts serves little use if that equipment can't be maintained once the military departs. Avoiding this situation requires a number of actions. First, the military should consider the level of technology the host nation is able to sustain (for example, digging wells with hand pumps rather than electric or battery-operated pumps). Second, training must be provided to those who will be responsible for using and maintaining the equipment. Third, spare-parts availability must be considered. The use of contractor-furnished equipment is preferred over government-furnished equipment for this reason.

Financial management

Financial management of the HAO should be a key consideration during the mission-planning phase. HAOs are frequently conducted on a fully or partially reimbursable basis. Planners need to consider forming a comptroller position on the C/JTF staff, whose encumbent would be responsible for ensuring that appropriate expenses are

identified and properly forwarded for reimbursement. The lead should be from the component that the CINC has tasked to cover the costs of the operations. In addition, the joint staff planning, warning, and execution orders should provide clear guidance on how to determine reimbursable expenses and how to bill them.

The military should address a number of different logistics-related funding issues during mission planning. The bottom line here is that accountability is important. Besides the reimbursement issue, planners must also address billing procedures and the issue of acquisition and cross-service agreements, as well as the issue of support to other nations (e.g., loan of vehicles to coalition partners).

Many financial logistics implications of military involvement in HAOs are not immediately apparent. One of these involves the impact of U.S. military contingency contracting procedures. Current procedures often lead to a situation where prices for local resources are artificially inflated because various elements of the C/JTF and the relief organizations are bidding against each other for the same resource. This has the effect of pricing the NGOs/PVOs out of the market, unnecessarily increasing the cost of U.S. deployments, inhibiting relief efforts, and disrupting existing logistics systems already in place. Ultimately, it also has long-term effects because the prices of these resources will remain high temporarily after the military leaves. A number of solutions to this problem exist. The best one is to consolidate contracting. All U.S. contracting requests should be forwarded through the C/J4 before the contracting office takes action. The goal here would be to expedite reviews of contract requirements to consolidate like requests and set priorities for execution. The C/JTF contracting offices should also deploy with a prevailing price scheme to ensure that the government and relief organizations will not pay inflated rates. This can be accomplished by surveys obtained before deployment through NGO/PVOs and through planning data obtained from the LOGCAP database.

Other general planning concerns

Besides the requirements discussed above, the military should address other general planning concerns during the pre-crisis and

mission-planning phases of an HAO. One of the most important is the consideration of sea-basing logistics support for the operation. In addition, there are continual requirements that it should address whether an HAO is imminent or not.

Sea-basing logistics support

The largest part of a C/JTF footprint during HAOs usually consists of logistics-support elements. Reduction of this footprint can help mission accomplishment by reducing U.S. presence, competition for scarce support resources, and stress on available infrastructure. Reducing this footprint can also help to address policy considerations related to host-nation sensitivities that focus on concerns about internal population responses to a foreign military presence on their soil. In those HAOs where resupply and support from sea-based assets is feasible, the C/JTF commander should consider using those assets rather than establishing similar operations ashore. This would require a major Navy role in the HAO.

Continual requirements

In addition to the issues listed above, other general planning requirements should be addressed, regardless of whether an HAO is imminent. For example, planners should develop force modules for the most likely HAOs. These "off-the-shelf" packages could provide proposed tables of organization, augmentation requirements, and equipment lists, as well as task checklists and other information critical to the mission-planning process.

As another example, the Marine Corps should continually review its acquisition strategy to ensure that Marines will have the equipment required to conduct HAOs in the future. To that end, it is important to have in place a process that continually assesses the current organization to determine the Marine Corps' capability to conduct HAOs. On a related note, the Marines (as well as the other services) tend to focus their acquisition strategies on the larger weapon systems that are geared toward warfighting, such as the AAAV and the V-22. But it is also critical to incorporate logistics-related equipment requirements into the overall acquisition strategy. This is particularly crucial for HAOs, where logistics and engineering equipment is likely to be

the asset most in demand. The Marine Corps should therefore ensure that its acquisition strategy reflects and incorporates HAO equipment requirements, such as ROWPUs, MHE, and other critical engineering equipment.

Some additional examples of requirements that can be executed at any time include:

- Developing a catalog of potential disaster-relief critical items and supplies
- Establishing base emergency stockpiles of survival items for domestic disaster-relief operations
- Reviewing and upgrading local base shelter plans for displaced persons
- Including NGO/PVOs and UN representatives in HAO training exercises
- Building infrastructure profiles of countries for which HAOs might be required in the future
- Developing local and regional disaster-preparation plans
- Reviewing the current MPF concept to ensure that it meets HAO requirements.

Specific logistics and engineering requirements for HAOs

In this section, we discuss what we term "specific" logistics and engineering requirements for HAOs. These requirements are specific to individual logistics and engineering functional areas. The "general" requirements discussed in the previous section provide the vehicle by which these specific requirements are defined and developed both before and during an HAO.

We divided the functional area-specific logistics and engineering requirements into the following categories:

- Roads, bridges, and rails
- Mines and unexploded ordnance
- Water
- Fuel
- Power
- Hygiene and sanitation
- Facilities construction and repair
- Food
- Transportation
- Supplies
- Camps and support structure.

For each of these functional areas, the military should think through whether providing this support will undermine current relief efforts and the ability of the follow-on organization to sustain the accomplishments of the military in these functional areas. The following

sections examine specific requirements for each of these areas in greater detail.

Roads, bridges, and rails

Table 3 in appendix A provides a summary of HAO engineering requirements that relate to roads, bridges, and rails. The two key requirements here include developing new lines of communication (LOCs), and clearing or repairing existing LOCs. These requirements are similar to those for traditional military missions.

Marine Corps engineers are equipped to develop new LOCs. Conducting reconnaissance and performing engineering assessments should be accomplished through heavy coordination with local government officials, relief organizations, and other civilian teams, such as Disaster Assessment and Response Teams (DARTs). This coordination must take place in the planning phase of the operation.

Building new LOCs requires clearing ground cover, building earthworks, providing drainage, stabilizing the soil, and preparing the surface. Developing new LOCs is a requirement most often associated with relief aid and disaster-relief operations. Operations Sea Angel and Restore Hope are examples of operations where this requirement existed and was met by Marine Corps engineers, as well as others.

Marine Corps engineers are also well equipped to improve or clear existing LOCs. Marine engineering units, augmented by their Naval Construction Force (NCF) (Seabees), can conduct limited rock-crushing operations, but if asphalt roads are required, civilian or other services will have to be used because Marine Corps engineers have no capabilities in this area (although they certainly can play a supporting role). Examples of operations where existing LOCs required improvement include disaster-relief operations (Hurricane Andrew, Sea Angel, Fiery Vigil), as well as relief aid and peacekeeping operations (Restore Hope and Uphold Democracy in Haiti).

Mines and unexploded ordnance

Table 4 in appendix A provides a summary of HAO engineering requirements that relate to the clearing of mines and unexploded ordnance. The two key requirements here include identifying and marking mine-hazard areas, and clearing mines. In general, these requirements are very similar to those for traditional military missions.

The Marine Corps has a robust capability to conduct mobility tasks, such as clearing mines. Identifying and marking mine-hazard areas is the first critical step in the process. This requires significant predeployment planning and training. Maps and imagery products need to be collected, coordination with local sources and other human intelligence (HUMINT) sources must be conducted, and training must be provided to all deploying personnel to ensure mine and munitions identification and recognition capability. Developing a mine recognition handbook was identified as a requirement from the Somalia experience.

Marine engineers are ideally suited and well trained to clear mines. In general, civilian forces have a limited capability to participate in mine-clearing operations. However, they can provide valuable assistance in the area of gathering information and identifying and providing translators and guides for mine-clearing operations. Recent HAOs that have involved mine identification and clearing include Restore Hope and Provide Comfort in Iraq.

Water

Table 5 in appendix A provides a summary of HAO engineering requirements that relate to water production and support. Requirements for this functional area are focused on three main tasks: (1) creating or identifying host-nation water-supply sources; (2) repairing and restoring existing water-supply facilities; and (3) providing bulk water support. The first two tasks are seldom requirements for traditional missions, but the third is a standard requirement for all types of missions.

When augmented by NCF (Seabee) well drilling, and provided with the worldwide water database services of the U.S. Army Corps of Engineers, Engineer Topographic Center, the Marine Corps has a limited capability for identifying alternative water-supply sources, such as wells and expedient extraction techniques. However, Marine Corps engineers do have a robust capability to repair and restore existing water-supply facilities, and provide bulk water or tactical water support, as they did in many previous HAOs (e.g., Restore Hope, Sea Angel, Hurricane Andrew, Fiery Vigil, and the San Francisco earthquake relief effort). Providing bulk water support and, especially, deploying ROWPUs, is most often a requirement for disaster-relief operations.

Fuel

Table 6 in appendix A provides a summary of fuel-related HAO engineering requirements. The primary requirement is to provide bulk fuel support to U.S. and coalition forces as required. This task includes identifying requirements and conducting estimates of supportability; establishing fuel farms; establishing a petroleum, oil, and lubricants (POL) office in the Joint Task Force (JTF), and coordinating support with all relevant agencies. A critical element of this coordination includes developing clearly defined lines of responsibility, as well as clear guidance on funding authorization. In general, HAO requirements associated with this functional area are similar to those for traditional military missions. However, providing fuel support to the local population needs to be carefully thought out so that, when the military leaves, the follow-on organization (UN, host nation, or relief organizations) can provide fuel, unless the reason for providing fuel is no longer valid.

The Marine Corps has provided fuel-related support in a number of recent HAOs. These include Restore Hope, Provide Comfort, and the Hurricane Andrew relief effort. We should also note that some of the requirements in this area are specific to HAOs. For example, one of the lessons learned during the Los Angelos riots (Operation Garden Plot) was that the Marine Corps should bring a MOGAS refueler or accepted credit cards for use in civilian gas stations when it deploys for such domestic operations.

Providing bulk fuel support is a primary responsibility of many Marine Corps engineering organizations. These engineer units install, operate, and maintain bulk fuel-handling systems, but they are not responsible for delivering to the consumer, other than onsite direct dispensing. Civilian forces, host nation, or other sources of engineer support probably have a light-to-minimal capability to provide this type of support for HAOs.

Power

The generation of electric power is a services function normally performed by engineer units (although other Marine Corps units do hold their own generators). Table 7 in appendix A provides a summary of HAO engineering requirements that relate to electric-power generation and restoration. In general, HAO requirements for this functional area are similar to those for traditional military missions. However, again the military needs to use power carefully so that the follow-on organization can continue maintaining the power until the power is no longer needed. This requires coordination with the follow-on organizations.

Requirements for this functional area focus on two main tasks: restoring existing power supplies, and providing power service. The restoration of existing power supplies is most often a requirement in disaster-relief operations, such as Hurricane Andrew and Fiery Vigil. For example, during the Hurricane Andrew relief effort, Marines transported and installed poles for electric power lines. However, restoring existing power supplies can also be an important requirement in nation building or peacekeeping missions, such as the one recently performed in Haiti.

Generating and providing electric power is required to support not only military units, but also civilian needs, such as power for tent cities and life-support centers. Unique power requirements are also associated with HAOs. For example, one of the lessons learned during the Hurricane Andrew relief operation was that the Marine Corps needs to identify and plan for potential generator incompatibilities with civilian devices.

Hygiene and sanitation

Table 8 in appendix A provides a summary of HAO engineering requirements that relate to hygiene and sanitation. Three key requirements for this area are as follows: (1) removing and clearing debris; (2) restoring essential public sanitation services; and (3) providing hygiene and sanitation services. Improving hygiene and sanitation can be a singularly key element in improving health conditions in the host nation, and these are necessary functions in support of disease reduction, which can make HAOs a success in spite of other potentially less than satisfactory results.

Conducting nonexplosive demolition and obstacle/debris removal is a primary responsibility of many Marine Corps engineers. In addition, civilian forces also have a robust capability to perform these tasks. Coordinating with local government and civilian organizations, as well as relief organizations, is critical for this task. Requirements for a task of this nature are most often found in disaster-relief missions, where debris that threatens public safety (human or animal remains, blockage of drains and sewers, etc.) must be removed as quickly as possible.

The restoration and development of essential sanitation and hygiene services for the general public (i.e., providing temporary power to sewage facilities, restoring/repairing sewage treatment facilities, or in a refugee-camp situation, digging and building latrines) is a requirement for which Marine Corps engineering units can play a supporting role. However, they have little organic capability to conduct these functions without assistance from the other services or civilian forces.

Marine engineering units are capable of providing field sanitation and hygiene services, such as bath and laundry facilities. These services are most often provided to Marine Corps units, but can also be used to support hygiene and sanitation efforts for tent cities, refugee camps, and life-support centers. Operations GTMO, Provide Comfort, Hurricane Andrew, and the San Francisco Earthquake relief effort all provide examples of operations where the Marine Corps helped provide hygiene and sanitation services to the general public. Marine Corps support in these operations included, among others,

providing trash-removal services, head and shower services, and laundry services; and establishing garbage dump, storage, burn, and compacting sites.

Facilities construction and repair

Marine Corps engineer capabilities are tailored toward meeting facilities construction and repair-related requirements associated with HAOs. The following are general facilities construction and repair requirements for which Marine Corps engineering organizations have significant capabilities:

- Conducting engineering reconnaissance
- Surveying and drafting
- Planning construction, repair, and maintenance of camps
- Constructing semipermanent camps
- Constructing logistical support bases
- Constructing airbases
- Performing vertical construction
- Building expedient airfields
- Constructing aircraft revetment/dispersal sites
- Repairing airfield damage
- Performing rapid runway repair
- Constructing and repairing port/waterfront structures.

Table 9 in appendix A provides a summary of specific HAO engineering requirements that relate to facilities construction and repair. As with the previous tables, these requirements reflect lessons learned from recent HAOs. We identified five key requirements: (1) surveying sites and planning facilities; (2) acquiring construction materials; (3) repairing existing facilities; (4) improving for constructing airfields and seaports; and (5) constructing new facilities.

Surveying sites and planning facilities is a requirement for most HAOs. Delineating responsibilities and establishing priorities for engineering work are key tasks that should be considered in the predeployment phase. All Marine Corps engineering organizations are capable of conducting these tasks. Similarly, acquiring construction materials is a key predeployment task. Identifying available in-country assets and contract construction sources, and coordinating with local governments are essential to the success of this effort. Members of the relief community should also be consulted because they know the culture of the population and can help ensure that appropriate facilities are built in the appropriate places.

Repairing existing facilities is also an important engineering-related requirement for HAOs. These requirements most often include repairs to sewage-treatment facilities, existing power-generation facilities, and emergency repairs to key public, private, and base structures that are considered unsafe.

Improvement of existing airfields and ports, as well as construction of expeditionary airfields, are key tasks conducted by Marine Corps engineering units during HAOs. Recent HAOs in which airfields and ports were constructed or improved include: Restore Hope, Provide Comfort, and Sea Angel. Marine Corps engineers can build expedient airfields, repair and improve bare-base existing airfields, and construct airbases. Marine engineers can also conduct rapid runway repair. Construction and repair of port/waterfront structures, however, is the primary responsibility of the NCF and civilian forces.

Food

Table 10 in appendix A provides a summary of HAO requirements related to subsistence. Two key requirements for this area are (1) constructing and running field kitchens, and (2) distributing and storing food. In general, subsistence requirements for the military forces in HAOs are similar to those for traditional military missions.

Constructing and running field kitchens for HAOs differ from traditional missions in several ways. For example, Marines might be required to provide messing facilities for emergency-response

personnel during domestic crises. Another HAO-unique requirement centers on the need to identify refugee dietary requirements and restrictions when providing subsistence to local populations in foreign countries or when running refugee camps. The military should also think about the long-term effects of providing food to the population in terms of agriculture, the economy, and so forth. The relief community should be consulted in this regard. The requirements associated with the distribution and storage of food are similar for both types of missions.

Transportation

Table 11 in appendix A provides a summary of HAO transportation requirements. Two key requirements for this area are (1) establishing a distribution system for relief supplies; and (2) providing transportation services.

Requirements associated with establishing a distribution system for relief supplies include: establishing a joint movement center; identifying long-haul assets to move forces and supplies inland, and developing contingency plans for replacement of long-haul vehicles. Other requirements are contracting drivers for long-haul support and ensuring coordination between transportation units and traffic control military police (MPs). These requirements are similar to those for traditional military missions.

Requirements associated with providing transportation services include planning for and providing transportation for USMC forces, relief supplies, relief personnel, media representatives, and VIPs. Current Marine Corps capabilities are sufficient to meet all requirements associated with this functional area. In this respect, HAOs differ from more traditional military operations in regard to coordinating the military's transportation assets and capabilities with the needs of relief organizations.

Supplies

Table 11 in appendix A provides a summary of HAO requirements relating to supply support. Three key requirements for this area are

(1) acquiring supplies, (2) warehousing supplies, and (3) providing supply support in theater.

Acquiring supplies includes: identifying requirements by class of supply; identifying reliable vendors; identifying prepositioned stock availability in or near the theater; and conducting host-nation support contracting. Warehousing supplies includes: identifying requirements for warehouse space, MHE, and customs; developing plans for the control and storage of donated food; and establishing depots to receive, account for, and store supplies. Finally, providing supply support in the host nation includes: sustaining U.S. forces with all classes of supply and services; providing the capability to support other UN and coalition forces as required; and providing supply support to relief organizations or the host nation.

Again, supply support is an area where Marines have a very robust capability. In general, HAO requirements within this functional area are similar to those for traditional military missions. However, HAOs are unique in regard to the type of supplies the mission may require. For example, some coalition members in Haiti and Somalia required livestock to be procured and delivered alive. In addition, HAOs may require engineering supply support (e.g., lumber and construction materials). In addition, there will probably be a greater demand for supplies for women and children than supplied in normal military supply packages.

The receipt and warehousing of supplies during HAOs is also likely to differ from traditional military missions. In many HAOs, the military will primarily be playing a supporting role in the logistics effort. In addition, instead of developing an organic logistics-support system for the warehousing and distribution of supplies, the military might have to utilize and accommodate the existing logistics-support system already established in country by the relief organizations in order to ensure minimal disruption of relief activities.

A final area where supply support during HAOs might differ from that for traditional military missions concerns donated goods. In past HAOs, the military has often been overwhelmed with the control and storage requirements associated with goods donated by concerned citizens. Effective control of these assets requires a well-developed

plan, as well as extensive coordination with the Federal Emergency Management Agency (FEMA) and other organizations that are likely to be involved in the collection and distribution of donated goods.

Camps and support structures

Table 13 in appendix A provides a summary of HAO requirements for establishing displaced-persons camps and support structures. Constructing and running new camps, such as refugee camps and life-support centers, has been a key requirement in recent HAOs. Restore Hope, Provide Comfort, GTMO, Uphold Democracy, Hurricane Andrew, and the San Francisco earthquake-relief effort were all operations that included the requirement to construct either base camps, refugee camps, or life-support centers.

The construction of each one of these facilities was accompanied by unique requirements. For example, one of the lessons learned from Provide Comfort and GTMO was that the refugees should be included in the design and operation of the camp. In addition, camp inhabitants should be organized to establish a stable infrastructure. Refugees should be given the maximum responsibility possible for performing the day-to-day routines associated with camp maintenance and care. And lastly, a system needs to be implemented to ensure accountability of migrants within the camps. The relief organizations that may be providing relief should also be involved in planning the camps.

As another example, the Hurricane Andrew relief effort identified a requirement to develop specific plans to accommodate differences in civilian and military standards, such as safety standards to protect children (i.e., protective covers on tent pegs) and electrical-power incompatibilities between civilian and military equipment.

Wrap-up

In summary, organic Marine Corps logistics and engineering capabilities that are usually viewed in the context of traditional military missions are well suited to meet nontraditional military missions as well. Many of the logistics and engineering tasks conducted during traditional military missions are identical or very similar to those required for HAOs. As a result, current Marine Corps logistics and engineering capabilities are ideal for meeting many, if not most, of the requirements associated with HAOs.

However, meeting these requirements in the best way for the situation in HAOs is different from warfighting operations. The military is usually supporting relief organizations or the host nation in an HAO. When the military provides logistics and engineering services, it needs to provide them in a way that doesn't undermine the existing relief structure so that its effort can be sustained by the local population or the follow-on organization. This requires accurate assessments and extensive coordination with the host nation, relief community, and UN (as appropriate).

The assessment should include not only what should be repaired, improved, or developed, but what the humanitarian capabilities are of the local population, relief organizations, coalition partners, and the relief structure already in place so as not to undermine the efforts of the other players. The assessment also needs to encompass the support needed by these other players.

To better understand how to successfully provide logistics and engineering support to an HAO, the military must coordinate extensively with those it's supporting. During operations, a CMLC can be established to facilitate logistics and engineering coordination. However, this coordination must also take place during planning so that the military does not bring in unneeded or inappropriate types of support. In addition, transition planning needs to take place early on.

Finally, the military should understand what can be sustained by the follow-on organization or host nation so that it develops an appropriate plan.

Table 1 provides a summary of these unique requirements, and identifies the major areas of the combat-development process (doctrine, organization, training, or equipment) that need to be addressed in order to meet the requirement.

Table 1. HAO-unique logistics and engineering requirements summary

Requirements	Cost considerations			
	Doctrine	Organization	Training	Equipment
Establish NGO/PVO liaison positions at potential C/JTF headquarters	X	X		
Establish NGO/PVO liaison positions on each CINC staff	X	X		
Include relief community in C/JTF HAO exercises			X	
Establish procedures for coordinating with DART & others in country	X		X	
Develop procedures for accessing LOGCAP logistics database			X	X
Develop database of military-unique logistics capabilities for HAOs				X
Incorporate LOGCAP considerations into mission-planning process	X		X	
Develop SOP for coordination of logistics assessments	X		X	X
Develop system to consolidate & prioritize logistics requirements	X		X	X
Develop off-the-shelf logistics and infrastructure profiles of countries			X	
Develop detailed logistics transition handoff plans	X		X	
Modify contingency contracting procedures	X			
Ensure infrastructure improvements are sustainable	X		X	X
Utilize and accommodate existing logistics support system in country	X	X	X	
Develop logistics & engineering MOEs to track progress to end state	X		X	
Develop & include logistics exit strategy as part of military end state	X		X	
Ensure C/JTF contracting officers deploy with prevailing price scheme	X			
Develop SOP for reimbursement & billing procedures	X		X	
Develop SOP for cross service/other nation logistics support	X		X	
Identify alternative C/JTF organizational structures for logistics support	X	X	X	
Develop SOP for incorporating non-military reqts in deployment plan	X		X	
Develop alternative logistics seabasing concepts	X	X	X	X
Develop off-the-shelf force modules for specific types of HAOs			X	
Develop catalog of potential disaster relief critical items and supplies			X	X
Review and upgrade local base shelter plans for displaced persons	X		X	
Review current T/Es to determine USMC suitability to conduct HAOs				X
Incorporate non-warfighting equipment reqts into acquisition strategy				X
Establish total base emergency stockpiles of survival items				X
Identify and plan for civilian-military equipment incompatibilities			X	X
Develop mine/munitions identification training program & materials			X	
Develop SOP for control and storage of donated goods	X	X	X	
Develop plan to accommodate differences in civilian-military standards			X	X
Develop SOP for establishing and running refugee camps and LSCs	X	X	X	
Review current MPF concept to ensure it meets HAO requirements	X			X

Appendix A: Logistics and engineering requirements matrices for HAOs

This appendix provides the detailed logistics and engineering requirements matrices for HAOs. We included general requirements that apply to the range of engineering and logistics functional areas, as well as specific requirements that apply to each functional area. The functional areas we covered include the following:

- Roads, bridges, and rails
- Mines and unexploded ordnance
- Water
- Fuel
- Power
- Hygiene and sanitation
- Facilities construction and repair
- Food
- Transportation
- Supplies
- Camps and support structure.

The reference list for this appendix is the same as that listed previously. The following abbreviations apply to the tables that follow:

- USMC Organic Capability:
  - H = Heavy
  - M = Medium
  - L = Light
  - N = None

Table 2. General HAO logistics and engineering requirements

Requirements	USMC organic capability
Conduct liaison and coordination	H
Establish liaison with NGO/PVO community	H
Establish on-call NGO/PVO liaison position at the C/JTF headquarters	H
Act as coordinator/mediator between assisted govt and NGOs/PVOs	M
Conduct liaison with senior UN representatives to deconflict requirements	H
Conduct liaison with nation's forces and other coalition forces as required	H
Establish liaison officers and liaison cells at the C/JTF headquarters	H
Coordinate with OFDA-DART and other in-country assessment teams	H
Send J-4 and logistics/engineering team to forward support base	H
Conduct initial assessments	H
Share, collect, and manage logistics and engineering information	H
Arrange access to LOGCAP logistics database	M
Identify military unique critical logistics capabilities that apply to HAOs	H
Form emergency response teams to assess and identify requirements	H
Participate in survey teams	H
Identify potential alternatives for meeting requirements	H
Identify active force, reserve force, contractor, and HN capabilities	H
Consider LOGCAP as a CSS replacement force	M
Include LOGCAP contractor in early phases of mission planning	M
Establish SOP to minimize proliferation of logistics assessments	H
Build comprehensive logistics and infrastructure profile of host country	M
Identify host nation and regional sensitivities	M
Incorporate relief organization and coalition force reqts into plan	M
Develop system to consolidate, prioritize, and coordinate requirements	H
Conduct detailed predeployment engineer support assessment	H
Establish and continually assess theater log & engineering priorities	H
Develop initial plans and concepts of operation	H
Provide initial planning guidance and concepts of support early in CAP	H
Develop standardized procedures for reporting	H
Clearly affix and assign log & engineering support responsibilities	H
Update planning guidance as situation develops	H

Table 2. General HAO logistics and engineering requirements (continued)

Refer to available HAO and peacekeeping guides and resources	M
Plan for transfer of logistics and engineering functions	H
Incorporate sustainability of accomplishment considerations	M
Develop logistics transition handoff plan	H
Identify termination standards (end states) for all types of support	H
Develop clearly defined MOEs to track progress toward end state	H
Develop logistics exit strategy as part of military end state	M
Establish role of military forces in logistics and engineering efforts	H
Address financial management issues	H
Develop cost-reduction techniques for local contracting of log support	M
Form a comptroller function on the C/JTF staff	H
Ensure planning/warning/execution orders address reimbursable expenses	H
Address other funding issues as required	H
Clarify billing procedures	H
Develop acquisition and cross-service agreements	H
Develop SOP for logistics support to other nations	H
Develop concept for force deployment	H
Identify key considerations and requirements	H
Develop procedures to support critical movement needs of others	H
Manage development of FIE and FOS from total theater reqts view	H
Identify the organizational structure for logistics support	H
Consider formation of a JLSC and CMLC	H
Address other general planning concerns	H
Consider sea-basing of logistics support	H
Develop force modules for specific types of nontraditional missions	H
Develop catalog of potential disaster relief critical items and supplies	M
Develop redeployment plan and address key redeployment issues	H
Develop plan for remain-behind equipment (RBE)	H
Coordinate and prioritize phased redeployment of forces	H
Plan for the reconstitution of MPF stocks	H
Develop plan for maintenance/preparation of equipment	H
Establish total base emergency stockpiles of survival items	H
Review and upgrade local base shelter plans for displaced persons	H
Review acquisition strategy to ensure suitability to conduct HAOs	M

Table 3. HAO logistics and engineering requirements: roads, bridges, and rails

Requirements	USMC organic capability
Develop new lines of communication (LOCs)	H
Develop reconnaissance reqts and estimates of supportability	H
Identify and select LOCs	H
Build new LOCs	H
Build bridges	H
Improve existing LOCs	H
Perform LOC reconnaissance and assessment	H
Organize and provide working parties for clearing ops	H
Clear debris to open major road arteries	H
Conduct rock-crushing operations for road improvements	M
Prepare/Improve entry and exit points	H
Clear railroads of downed power lines and debris	H
Repair damaged rails	L
Repair bridges	L

Table 4. HAO logistics and engineering requirements: mines and unexploded ordnance

Requirements	USMC organic capability
Identify and mark mine-hazard areas	H
Develop and execute a mine/munitions identification training program	H
Develop a handbook for mine recognition and disarming	H
Provide standard maps and imagery products/provide topographic spt	N
Develop reconnaissance requirements and estimates of supportability	H
Clear mines	H
Identify HUMINT and translators for use in mine-clearing operations	M
Conduct mine-clearing operations	H

Table 5. HAO logistics and engineering requirements: water

Requirements	USMC organic capability
Create/identify alternative water supply sources	L
Develop well-drilling requirements and estimates of supportability	L
Identify and survey possible locations for wells	L
Drill wells	L
Identify alternate firefighting water-supply sources	L
Incorporate alternatives into local & regional disaster prep plans	L
Identify USN vessels available for supporting emergency svc hookups	H
Repair and restore existing water-supply facilities	M
Repairing existing wells (pumps and generators)	M
Restore local water supply	H
Provide bulk water support	H
Develop production requirements and estimates of supportability	H
Identify water-purification chemical requirements	H
Identify status of MPS equipment readiness/shortfalls	H
Identify MPS water-generation and storage capability	H
Identify and procure proper equipment for receiving water from MPS	H
Identify potable water transportation requirements	H
Identify potable water storage requirements	H
Identify bottled water requirements	H
Deploy ROWPUs	H
Provide water service for tent cities	H

Table 6. HAO logistics and engineering requirements: fuel

Requirements	USMC organic capability
Provide bulk fuel support	H
Develop requirements and conduct estimates of supportability	H
Identify coalition fuel type requirements	M
Identify MOGAS and JP-5 requirements as early as possible	H
Identify alternates for resupply of MOGAS and JP-5	M
Identify requirements for bulk fuel specialists	H
Identify OPDS ship requirements	M
Establish fuel farms	H
Establish a POL office in the JTF	M
Coordinate fuel support with DFSC	M
Identify lines of responsibility	M
Develop clear guidance on funding authorization	M
Bring MOGAS refueler or credit cards to use in civilian gas stations	H
Establish contingency vehicle refueling procedures for 24-hour ops	H
Establish refueling support sites for helicopter operations	H

Table 7. HAO logistics and engineering requirements: power

Requirements	USMC organic capability
Restore existing power supplies	H
Develop requirements and conduct estimates of supportability	H
Restore basic utilities	M
Transport and install poles for electric power lines	M
Provide power service	H
Identify power-generation requirements	H
Identify potential generator incompatibilities with civilian devices	H
Identify USN vessels available for supporting emergency service hookups	H
Provide emergency power generation	H
Provide power for tent cities	H
Establish initial power for Major Subordinate Commands (MSCs)	H
Manage distribution of mobile electric power (MEP) assets for each MSC	H

Table 8. HAO logistics and engineering requirements: hygiene and sanitation

Requirements	USMC organic capability
Remove and clear debris	H
Conduct liaison with local govt and USACE to identify debris-removal priorities	H
Identify equipment requirements for debris removal	H
Remove debris threatening public safety	H
Clear drains and sewers of debris	H
Restore essential public sanitation services	L
Provide temporary power to sewage facilities	L
Restore and repair sewage-treatment facilities	L
Provide hygiene and sanitation services	M
Provide trash removal services	H
Provide head and shower services	H
Provide laundry service	H
Provide sewage/waste-disposal services	M
Establish plan for garbage removal & general policing of local areas	M
Establish garbage dump/storage/burn/compacting site	M
Identify environmental limitations/restrictions	L

Table 9. HAO logistics and engineering requirements: facilities construction and repair

Requirements	USMC organic capability
Survey sites and plan facilities	H
Establish priorities for engineering tasks	H
Delineate responsibilities for SEABEEs & USMC engineering organizations	H
Identify funding sources and authorities for facility construction & repair	H
Identify environmental limitations/restrictions	M
Develop plans for facilities construction and repair	H
Acquire construction materials	H
Identify, prioritize, and request reqd construction materials & equipment	H
Identify available in-country assets	H
Identify contract construction sources	H
Coordinate with local govt to identify sources of heavy equipment	H
Identify additional requirements/augments to existing pioneer tool kits	H
Ensure all deploying units bring organic pioneer/construction tool kits	H
Repair existing facilities	H
Repair sewage-treatment facilities	H
Repair existing power-generation facilities	H
Perform emergency repairs to key public, private, and base structures	H
Secure unsafe structures	H
Install temporary roofing	H
Provide technical support to other services	H
Repair equipment for civilian agencies	H
Improve and/or construct airfields and ports	H
Perform airfield expansion and repair	H
Clear airfields and runways	H
Construct expeditionary airfields	H
Assist in establishing helicopter-landing zones	H
Identify emergency lighting requirements to support helicopter operations	H
Identify and construct beddown sites for arriving aircraft	H
Develop plans for alternative and emergency berthing services for port ops	H
Construct new facilities	H

Table 10. HAO logistics and engineering requirements: food

Requirements	USMC organic capability
Construct and run field kitchens	H
Identify food supply requirements	H
Identify food service support equipment requirements	H
Identify mobile kitchen unit requirements	H
Provide rations	H
Contract for food service support from local vendors	M
Develop plan to provide messing facilities for emergency response personnel	H
Establish ration-card system	H
Identify refugee dietary requirements and restrictions	L
Distribute and store food	M
Provide refrigeration for storage of perishable food	M
Identify available commercial assets	M
Consider using Navy Combat Supply Ship to refrigerate perishable food	M
Distribute food	H
Establish food warehouses and supply stores	H
Select food distribution and food stockpile sites	H
Develop plan for transition from military to civilian agencies	M

Table 11. HAO logistics and engineering requirements: transportation

Requirements	USMC organic capability
Establish distribution system for relief supplies	M
Establish a joint movement center	M
Identify transportation support personnel to supervise contracted assets	H
Identify long haul assets to move forces and supplies inland	H
Develop contingency plans for replacement of long-haul vehicles	H
Contract truckers for long-haul support	M
Identify requirements for other transportation assets (i.e., Army LCUs)	H
Identify local contractors to assist with supply distribution	H
Ensure coordination between transportation unit and traffic-control MPs	H
Obtain commercial vehicles for logistical support during civil disturbances	M
Identify specific transportation service requirements	H
Provide transportation services	H
Provide services for self-deployment of USMC assets	H
Provide services for carrying relief supplies	H
Provide services for moving relief personnel	M
Provide aircraft to augment ground transportation	H
Provide helicopter transportation support for media and VIPs	H

Table 12. HAO logistics and engineering requirements: supplies

Requirements	USMC organic capability
Acquire supplies	H
Identify supply requirements by class of supply	H
Identify reliable vendors	H
Identify prepositioned stock availability in or near theater (USMC and USA)	H
Identify/locate supplies in nearby countries	H
Coordinate with contracting offices in region	H
Conduct host-nation support contracting	H
Identify sources of supply and services	H
Identify reputable vendors	M
Identify sources who accept credit cards	M
Warehouse supplies	H
Develop requirements for warehousing relief supplies	H
Identify MHE and cargo-handling equipment requirements	H
Identify customs requirements and develop to accommodate requirements	M
Identify requirements for early flow of supply personnel	H
Provide personnel for working parties to load/unload supplies	H
Provide MHE and cargo-handling assets	H
Define responsibilities for individual agencies/services	M
Deploy cargo-arrival monitoring team to account for arriving supplies	H
Develop plan for control and storage of donated goods	M
Coordinate with FEMA cell/establish cell to deal with donations	H
Establish depots to receive, account for, and store supplies	H
Form logistics support group to establish and operate depot system	H
Develop requirements & plans for forward humanitarian support depots	H
Consolidate all Class IV stock with the engineering units	H
Develop storage plan by commodity/class of supply	H
Provide supply support in the AOR	H
Provide capability to sustain U.S. forces with all classes of supply & services	H
Establish APODs and SPODs/APOEs and SPOEs	H
Provide capability to support other UN/coalition forces with supply	M
Determine requirements to meet HRO shortfalls	M
Develop specific guidance by class of supply	H
Provide supply support/logistics support to NGOs/PVOs	M
Develop distribution plan for supplies	M

Table 13. HAO logistics and engineering requirements: camps and support structure

Requirements	USMC organic capability
Construct camps	H
Build base camps	H
Ensure deploying units bring organic wire harness kits/light sets	H
Build refugee camps	H
Coordinate with UNHCR and identify specific requirements	H
Lay down camp design before moving in refugees	H
Ensure refugee participation in design and operation of camp	H
Build life-support centers (tent cities)	H
Develop plans to accommodate differences in civil and military standards	H
Identify service reqts (phone, laundry, medical, entertainment, etc.)	H
Run camps and life-support centers	M
Organize camp inhabitants to establish stable infrastructure	M
Identify division of labor for refugees for food distribution, other tasks	M
Assist INS in tracking migrants within camps	M
Identify task organization requirement to establish and operate (LSC)	M
Liaison/coordinate with local officials and relief groups	H
Coordinate with Red Cross	H
Coordinate with local hospitals, as well as mental health professionals	H
Coordinate with local civic organizations	H
Coordinate with state and federal agencies assisting in victim recovery	H
Coordinate with FEMA representatives	H
Coordinate with local governing agency to identify responsibilities	H
Develop system for tracking residents of the camps	M
Identify specific requirements	H
Identify linguist requirements	H
Identify security requirements	H
Identify contracting requirements	H
Develop plan early on for transition to Red Cross/local officials	M

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